

# INSTITUTIONAL WASTE WITHIN THE UK CONSTRUCTION PROCUREMENT CONTEXT: A CONCEPTUAL FRAMEWORK

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## ABSTRACT

There is a broad consensus among social and economic researchers that ‘institutions’ matter. Institutions influence beliefs, norms and actions; thus they shape performance and outcomes. Interestingly, the concept of institutions is not well established in construction economics or management research, specifically in waste-related literature. This paper presents discussions on the impact of imperfect regulations, norms and cultural/cognitive assumptions that exist within the construction procurement context, and how this has translated into the institutionalisation of wasteful behaviours and practices in construction projects. Based on a critical review of extant literature, the ultimate objectives of this study are to: (1) contribute to the overall understanding of waste in construction by suggesting a novel perspective to the generation and persistence of waste in construction projects; (2) demonstrate how the neo-institutional theory, a branch of organizational sociology, can potentially be applied as an analytical lens to deliver a more explicit theory of waste that relates cause and effect within the wider aspects of construction procurement systems and relationships; (3) highlight a number of widely accepted regulations, norms and meanings that impede efficiency and improvement efforts in construction; and (4) formulate propositions on institutional waste in the process of construction procurement that will be fundamental to the future trajectory of this study.

## KEYWORDS:

Waste, Institutional theory, Lean Construction, Construction Procurement, Organisational Studies

## INTRODUCTION

It is widely accepted that there is considerable waste in the end-to-end design, construction and facility management process. Over the past sixty years the industry has commissioned several reports with the aim of reviewing its performance and suggesting means of improvement. Of these, the Egan report, ‘Rethinking Construction’, was produced in 1998 to address concerns raised by clients engaging services of construction companies; and was followed by the ‘Never Waste A Good Crisis’ report published by construction excellence in 2009 to review the subsequent progress. The former report sent a clear message to the construction industry by stressing that:

*“Recent studies in the USA, Scandinavia and this country suggest that up to 30% of construction is rework, labor is used at only 40-60% of potential efficiency, accidents can account for 3-6% of total project costs, and at least 10% of materials are*

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*wasted...The message is clear - there is plenty of scope for improving efficiency and quality simply by taking waste out of construction” (Egan, 1998, p.15).*

Empirical evidence points to waste in excess of 50% of construction time (Figure 1), where waste is defined as anything that is not required to create value for the customer/client or end-user. This is primarily process waste with some physical waste. The fact that much of this waste is common to many projects suggests that there are imperfect systems and structural arrangements that support and/or encourage wasteful activities. To say that waste is created due to human error is unhelpful; blame arguably fails to facilitate learning to ‘do better’ and similarly fails to lead us towards effective methods of reduction or prevention. As Dr Deming taught us: *‘94% of troubles and failures are attributed to the system (responsibility of management), 6% are due to special cases (such as human mistake)’* (Deming, 1984, p. 315). Human behaviour is always influenced by the environment in which it takes place (i.e. broader organisational system or institutional environment). Without a deep understanding of the economic, social and environmental issues contributing to poor decision-making, it is very likely that similar flawed or risky decisions will recur. For this reason, Levensen (2011) emphasises that: *‘Without changing the environment, human error cannot be reduced for long. We design systems in which human error is inevitable and then blame the human and not the system design’* (p. 61).

**Figure 1:** Analysis and examples of waste in construction. Proportions based on studies by Diekmann et al. (2004) in the US and unpublished studies in the UK by Cameron Orr, AWD and Construction excellence as cited by Mossman (2009). Diagram adopted and modified from Mossman (2009)

The UK Government has recently created a set of challenging construction targets for 2025 (HM Government, 2013). These include a 50% faster delivery, 50% lower emissions, and a 33% reduction of clients' capital costs – business as usual won't meet this target. There is no doubt that eliminating (process and physical) waste from construction design and delivery is a necessary step towards achieving these goals. There is also no doubt that the adoption of lean production theories into construction has helped to understand and identify many of the causes and origins of waste in construction projects, in particular at the project delivery (production) phase. However, the prevailing understanding of waste, arguably, encourages the improvement of current processes rather than fundamental system redesign. Obtaining a better understanding and conceptualisation of waste in construction is therefore becoming more crucial to prepare the industry for the radical change demanded.

## CONCEPTUALISATION OF WASTE IN CONSTRUCTION

The formal adaptation and transfer of the new production philosophies into construction projects has been ongoing since the early 1990's (Koskela, 1992). These philosophies were characterised as “lean” from the study of Toyota (Krafcik, 1988), and the term *‘Lean Construction’* rose to prominence with the formation of the International Group for Lean

Construction<sup>1</sup> in 1993. The concept of lean was formally recommended to the UK construction industry by a Government report (Egan, 1998). Traditionally, the term 'waste in construction' is usually limited or intuitively linked to physical (material) waste. The concept of material waste in construction has been widely addressed but the widened understanding introduced by the seven process wastes identified in the Toyota Production System (TPS) (Ohno, 1988) has struggled to be transferred. Process waste is directly associated with executing tasks and conforms to the current understanding of project management as '*a specific set of operations designed to accomplish a singular goal*' (Project Management Institute<sup>2</sup>). In this way, production is defined as transforming resources towards the finished product or project and waste can be seen as the inefficient use of resources in the execution of tasks. The disadvantage of this understanding of waste is that it drives the improvement of current processes rather than radical new system design.

Koskela (2000) advances the definition of lean production to the combination of transformation tasks (T), flow (F) and value creation (V). This definition of production as TFV creates two additional dimensions to the conceptualisation of waste as the inefficient use of resources in tasks. The first additional TFV dimension, flow (F), reveals the interdependency of activities across the whole project process. The consideration of flow brings the supply chain and the logistics of getting resources to the point of transformation into focus. Elevating flow to a project production driver also alters the classification of process waste within tasks. For example, waiting within one task may now be necessary to expedite tasks downstream – this waiting is therefore no longer a waste and results in one task being sub-optimised in order to optimise the project. Consequently the pursuit of waste within transformation activities can itself become a cause of waste if it disrupts flow. Erratic and disrupted flow of processes provide further sources likely to cause waste recognised within TPS in two ways - the unevenness of workflow (Mura) and the related concept of the overburden of capacity (Muri) (Liker, 2004).

The second additional TFV dimension is created by considering value creation (V) and brings the customer into focus. The construction sector typically identifies clients and more recently users and stakeholders – the term customer is not commonly used. However, the inclusion of value creation into project production moves the conceptualisation of waste towards identifying what causes value-loss and questions from whose perspective. This conceptualisation will vary from project to project and from customer to customer meaning the understanding of what constitutes value and how it is created becomes an important part of the design of the project production system (delivery including logistics, design and procurement) and the project product (the physical facility or asset created and what it achieves). One aspect of this conceptualisation is the consideration of the organisational, commercial and institutional environments that surround the design and delivery of construction projects. It is this aspect that leads to the primary research question:

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<sup>1</sup> [www.iglc.net](http://www.iglc.net)

<sup>2</sup> [www.pmi.org](http://www.pmi.org)

'Is there anything in the commercial and institutional environments surrounding construction that is blocking radical new production system design and therefore pinning the prevailing wasteful system in place?'

The understanding of value and value loss (or waste) within these wider organisational, commercial and institutional environments is more difficult to determine not least because it requires a critical evaluation of the activities of different professions, for example lawyers, accountants, human resource managers, quantity surveyors to name a few. These environments and the professions within them also exhibit varying cultures, structures, systems and behaviours. Such an evaluation also needs to draw upon theory from disciplines outside both construction and manufacturing such as economics, law and sociology if it is to begin to explain the coherence and yet wastefulness of the current approaches to construction projects.

A contemporary study by Sarhan *et al.* (2017) reviewed the governance problems confronting clients and decision makers in construction procurement through the lens of Transaction Cost Economics. Their work led to novel explanations so as to why wasteful procurement practices persist, through an economic perspective. However, this study argues that an institutional perspective has the potential to add useful insights. Institutional theory gives significant consideration to context. It could also help to reveal the underlying fundamental paradigms that influence early project decisions and thus shape project performance and outcomes.

An empirical study by Wearne (2014) reviewed the problems of project management as reported by 1,879 individuals employed in the construction, manufacturing, process, and service industries in North-West Europe over 23 years. Interestingly when reviewing the data collected, the same categories of problems appeared to remain the main concern of project management. In an attempt to find answers so as to why many categories of project management problems persist, the analysis of his study reported that:

*“More than 75% of the problems reported by the participants are due to institutional practices within organizations rather than inherent in their projects. Many of these problems of project management could therefore be avoided, or at least reduced by early attention to their causes. As a result much of what is called “fire- fighting” in project management—urgent actions on problems that should not have been allowed to occur—could be prevented”* (Wearne, 2014, p. 72).

The findings of Wearne's (2014) empirical study support recent arguments for improvement in the “front end” decisions on project objectives, plans and governance arrangements (for example, see Edkins et al., 2012). This reinforces the need to investigate the institutional factors that influence early-project decisions and condition project procurement and governance arrangements. In the construction management literature, there are very few, if any, studies that have sought to explore the relationship between institutional factors influencing construction procurement choices and practices, and waste in construction

projects. Therefore, this study examines the current commercial and institutional arrangement within construction procurement and attempts to analyse them through the lens of Institutional theory. The study starts by providing a brief overview of the concept of waste-reduction in construction. Following this, the study illustrates the significance of conceptualising construction procurement systems as institutional arrangements. Next, the study reviews behavioural explanations provided by Institutional theory of organisational studies. Subsequently, the study demonstrates how the neo-institutional theory, a branch of organizational sociology, has the potential to be used as an analytical lens to deliver a more explicit theory of waste relating cause and effect within the wider aspects of construction procurement systems and relationships. The term 'waste' is almost always synonymous with physical waste (i.e. on-site material waste). However, throughout the following sections of this paper, the term 'waste' refers to the wider conceptualisation of waste as summarised above.

## **LITERATURE REVIEW METHODOLOGY**

This study hopes to shed light on a source of waste hitherto unacknowledged in construction. This, therefore, requires an in-depth review of selected relevant literature, with the intension of searching for latent themes (Braun and Clarke, 2006). This interpretative work entails a thorough review of the underlying ideas, assumptions, and conceptualisations informing the content of the data. For this reason, a generic purposive sampling strategy (Bryman, 2012) was adopted for literature review. This strategy is not driven by the statistical imperative of including every available study. Instead, it puts the research questions under investigation at the forefront of sampling considerations (Bryman, 2012). According to Doyle (2003, p. 326), a purposive sample is more appropriate than an exhaustive one, when the aim is explanation rather than prediction. Through this approach, the researcher decides what needs to be known, and deliberately chooses suitable literature which can potentially provide the most relevant information and have the largest impact on the enhancement of knowledge (Patton, 2015, p.276).

Based on these considerations, the study targeted peer-reviewed papers published by top journals using electronic search engines (e.g. University's Library OneSearch and Google Scholar) and hand-searching of peer-reviewed papers published by proceedings of the Annual Conference of the International Group for Lean Construction (IGLC). The main keywords and topics that were searched for and reviewed included: waste-minimisation in construction, wasteful attitudes and behaviours in construction projects, opportunistic practices, omission errors, conflicts and disputes, relationship between procurement and value loss, hidden transaction costs in construction projects, barriers to partnering, barriers to relational forms of contracting, barriers to lean and integrated project delivery, and changing roles of clients and professional service providers. As a result of this effort, 35 waste-related studies and 76 construction procurement and contractual related articles, ranging from 1994 to 2017, were identified and thoroughly reviewed. When qualitatively analysing the articles, a table of

information, that categorises information extracted from each paper, was created to help the authors with organising their thoughts (See Appendix 1).

## THE CONCEPT OF WASTE-REDUCTION IN CONSTRUCTION

The concept of waste-reduction has been fundamentally used as a key driver for improvement in the manufacturing industry, and arguably led to great achievements; but it has not been as prevalent in construction economics or management (Koskela and Ballard, 2012; Koskela *et al.*, 2012; Bølviken and Koskela, 2016). Research efforts aimed at understanding waste are relatively limited when compared to other topics in construction, and many waste-related studies continue to focus on the causes rather than the *root* causes. Two subsequent systematic literature reviews on empirical studies that relate to waste-minimisation in construction (Viana *et al.*, 2012; Formoso *et al.*, 2015) revealed that research is broadly focused on addressing three different categories of waste:

- (1) Construction material waste (physical waste);
- (2) Specific sorts of waste (such as accidents and rework).
- (3) Non value-adding activities (process waste);

Many studies in construction literature have concentrated on ‘waste-management’ strategies and implementation efforts on construction project sites (for example, Peng *et al.*, 1997; McDonald and Smithers, 1998; Lawson *et al.*, 2001). These studies have broadly focused on identifying and assessing strategies for re-using and recycling construction material waste, waste-quantification, waste management mapping to help with the handling of on-site waste, investigating the impact of legislation on waste management practices, suggesting improvements in on-site waste management practices, and developing on-site waste auditing and assessment tools (Osmani, 2012). The current approaches to research in the field of construction waste-minimisation are mainly focused on designing out waste (e.g. Keys *et al.*, 2000); waste minimisation guides for architects and designers (e.g. WRAP, 2009); attitudes, perceptions and behavioural factors towards construction waste minimisation (e.g. Osmani *et al.*, 2008; Begum *et al.*, 2009); the need for improved supply chain integration (e.g. Dainty and Brooke, 2004), and procurement waste minimisation strategies (Gamage *et al.*, 2009).

There are also some other research studies that have focused on specific types of waste such as: rework and design error reduction (e.g. Busby and Hughes, 2004; Love *et al.*, 2009, 2011a, 2013; Feng and Tommelein, 2009) knowledge flow and integration in different construction working environments (e.g. Ruan *et al.*, 2012), designing for construction worker safety (e.g. Toole and Gambatese, 2008), reducing waste by appropriate coordination mechanisms (Sandberg and Bildsten, 2011), and project disputes causations (Love *et al.*, 2011b; Mitropoulos and Howell, 2001). However, most of the studies that have investigated process waste and non-value adding activities have been undertaken by members of the lean construction community. There are many general classifications of process waste as defined in lean thinking. For example, they include Tachii Ohno’s seven wastes: transportation,



inventory, motion, waiting, over-production, over-processing, and defects (Ohno 1988, pp. 19-20). In addition, the waste of human potential - e.g. 'Not speaking, not listening' by Macomber & Howel (2004), and the 'Making-do' waste presented by Koskela (2004) is included within this category.

An overall analysis of waste-related literature in construction reveals five critical issues. First, researchers have gradually shifted their attention and studies from a mere focus on waste-management strategies that have mainly been concerned with the consequences of waste, to the promotion of waste-minimisation strategies, as a more sustainable approach that eliminates or reduces construction material waste at its source. Secondly, most of these waste-minimisation approaches, if not all, were directed towards finding means for reducing construction material waste (physical waste) as opposed to process waste. Other important issues such as time waste and value creation are much less explicitly explored.

Thirdly, there is no doubt that many of the problems that lead to the occurrence of waste in construction are strongly related to lean theories adopted in production management. However, it can still be argued that waste is created primarily from project-organisational and contractual problems (Williamson, 1991, pp.78-79); and as such, a focus on waste reduction in site-based production alone would be insufficient. As emphasised by Matthews *et al.* (2003), it is difficult to maximise value and minimise waste at the project level if the prevailing contractual structure hinders coordination, constrains collaboration and innovation, and sub-optimises performance and goals. Similarly, this study argues that procurement systems, as institutional arrangements, are designed to assign liabilities and authorities to people and organizations (Love *et al.*, 1998) at the project and programme levels; and thus structure the borders that shape '*the play of the game*' (Williamson, 2000). From a production management perspective, organisation and contracts are essential parts of the production system design; and thus there is no doubt that poorly aligned (imperfect) organisational and institutional arrangements may cause waste and impact on project outcomes (Koskela and Ballard, 2012). Fourthly, a small but growing number of studies have attempted to investigate the influence of procurement processes on the generation of waste in construction projects (e.g. Jaques, 2000; Gamage *et al.*, 2009). However all of these studies have only focused on the relationship between different procurement systems and the generation of construction material waste.

Finally, very limited, if any, waste-related studies have devoted attention to exploring performance-shaping mechanisms (i.e. systems and structural arrangements), as well as the institutional context in which human actions and decisions are constituted. In the construction management literature, there are hardly any studies that have sought to investigate the role played by institutional processes, within the construction procurement context, in embedding waste in construction projects. Waste here can be in the form of monetary, time or effort and can pre or post contract stages.

# THE CONSTRUCTION PROCUREMENT CONTEXT

## Construction Procurement Systems

A common theme of construction literature is the proliferation of definitions of a procurement system (See for e.g. Sharif and Morledge, 1994; Love *et al.*, 1998; Masterman, 2002; Watermeyer, 2012). Both terms: 'contractual arrangement' and 'procurement system' are often used synonymously (Love *et al.*, 1998). Similarly, procurement approaches and additional contract price provisions (e.g. lump sum, guaranteed maximum price, target cost, cost plus) are also commonly regarded as closely related (Oyegoke *et al.*, 2009). Interestingly, a study by Tookey *et al.* (2001) found that, in industrial practice, clients usually make amendments to mitigate risk and add usability to rigidly prescribed procurement systems that are imposed, in their view, by researchers and consultants when classifying procurement routes. For convenience, the definition adopted here is that a construction procurement system is a 'project-organisation system that arranges and governs the way that the parties involved can compete and/or cooperate in order to achieve their agreed programme and project goals'. Inspired by Masterman's (2002) forth-fold of procurement methods, Love *et al.*'s (1998) categorization of building procurement systems, Kumrasawy and Dissanayaka's (1998) hierarchy of procurement options, and Watermeyer's (2011) framework for developing a construction procurement strategy, this study further conceptualises major construction procurement arrangements as shown in Figure 2, and Table 1 below.

**Figure 2:** Major construction procurement systems and sub-systems

## Construction Procurement Subsystems and Options

Procurement subsystems or/and procedures are identical terms that are commonly used in literature. Previous studies have integrated specific procurement sub-systems to their hierarchy of procurement systems, when investigating the relationship between procurement systems, project parameters, and certain aspects of project-performance such as: time, cost, quality, work environment, and innovation (Kumaraswamy and Dissanayaka, 1998; Love, 2002; Eriksson and Laan, 2007; Eriksson and Westerberg, 2011). For example, the main procurement sub-systems conceptualised by Kumaraswamy and Dissanayaka (1998) are: work packages; functional groupings (i.e. separated, integrated and management-led); payment modalities; standard sets of contract forms or conditions; and selection methodologies. Similarly, Watermeyer (2012) suggested that procurement and contracting arrangements comprise: procurement selection strategy; procurement evaluation strategy; contracting strategy (functional groupings); pricing strategy; and form of contract.

In a conceptual study by Eriksson and Westerberg (2011) which developed a hypothetical procurement framework that examines how various procurement-related factors affect project performance criteria, procurement procedures at the buying stage were divided into three categories according to their relation to: competition, co-opetition and cooperation. These



procurement procedures consisted of: design; tendering; bid evaluation, subcontractor selection; payment; use of collaborative tools; and performance evaluation. Thus, for instance, subcontractors' selection-decisions made by either the contractor or the client would be related to competitive procurement procedures; joint selection with single responsibility would be a co-opetitive procedure; while joint selection with shared responsibilities would be regarded as cooperative.

Compellingly, very limited studies in construction management have explicitly considered and integrated, as part of their hierarchy of procurement systems, other critical procurement subsystems such as: insurance arrangements, bonds, collateral warranties, and alternative dispute resolution mechanisms, despite their significant importance and influence on project-teamwork performance. Building on the work of Wordley (1991); Kumaraswamy and Dissanayaka (1998), Love *et al.* (1998); Hughes *et al.* (2000); Sherif and Kaka (2003); Eriksson and Laan (2007); Ghassemi and Becerik-Gerber (2011); Masterman (2011), Eriksson and Westerberg (2011); Mante *et al.* (2012); Ndekugri *et al.* (2013); and Pasquire *et al.*, (2015), Table 1, provides the major options available within procurement sub-systems, as conceptualised within this study.

**Table 1:** Major options available within construction procurement subsystems

<b>Procurement subsystem /Procedure</b>	<b>Possible Options</b>
<i>Work packaging</i>	<ul style="list-style-type: none"> <li>• Break down based on contract value (e.g. large packaging to be employed for the purpose of high price competition, or small packaging if specialist expertise is required)</li> <li>• Divisions based on geographical divisions or functional and disciplinary divisions of contracts</li> <li>• Design based on sequence or interdependence of activities</li> <li>• Design based on Project risks and the allocation of responsibilities, or project needs</li> </ul>
<i>Form of contracts</i>	<ul style="list-style-type: none"> <li>• Standard un-amended set of contract forms and conditions from recognised bodies (e.g. FIDIC, NEC3, ICE, JCT, contracts)</li> <li>• Amended standard forms of contract which include special conditions of contract (e.g. special risk transfer/allocation, length of guarantee and additional insurance)</li> <li>• Multi-party agreement forms of contract (e.g. PPC2000)</li> <li>• Discrete/Bespoke contracts (custom-made)</li> </ul>
<i>Selection methodologies (Bid-evaluations)</i>	<ul style="list-style-type: none"> <li>• High weight on tender price</li> <li>• Equal weight on price and soft parameters</li> <li>• High weight on soft parameters (e.g. competence, reputation, capacity, collaborative-ability, and experience)</li> </ul>
<i>Payment mechanism</i>	<ul style="list-style-type: none"> <li>• Advanced payments</li> <li>• Milestone payments</li> <li>• Interim payments (e.g. Monthly payments)</li> <li>• Stage payments</li> </ul>

	<ul style="list-style-type: none"> <li>• Incentive/disincentive payments</li> <li>• Shared gain/pain arrangements/Target cost</li> </ul>
<i>Insurance systems</i>	<ul style="list-style-type: none"> <li>• Traditional insurance arrangements;</li> <li>• Single project-insurance option</li> </ul>
<i>Warranties</i>	<ul style="list-style-type: none"> <li>• Collateral warranties; or</li> <li>• latent defect insurance</li> </ul>
<i>Tendering approach</i>	<ul style="list-style-type: none"> <li>• Competitive open bid procedures with or without post-qualifications (one or two stage tendering);</li> <li>• Selected- limited bid invitation - with or without pre-qualifications; (one or two-stage tendering)</li> <li>• Direct negotiation with one preferred supplier (no tender)</li> </ul>
<i>Pricing strategy</i>	<ul style="list-style-type: none"> <li>• Price-based (e.g. Lump sum; Guaranteed maximum price; Bills of quantities; Price list/schedule; Activity-based scheduling)</li> <li>• Cost-based (e.g. cost-reimbursement; Target cost; and Target value design)</li> <li>• Mixed</li> </ul>
<i>Performance evaluation mechanisms</i>	<ul style="list-style-type: none"> <li>• Output control by client - inspection of the outcome</li> <li>• Process control by client - ongoing monitoring</li> <li>• Social control - Self-control by contractor</li> </ul>
<i>Strategy for achieving 'Secondary Objectives' (e.g. promoting sustainability, enhancing health and safety performance beyond statutory requirements, and poverty alleviation)</i>	<ul style="list-style-type: none"> <li>• Through the use of incentives that are provided in the form of tender evaluation points</li> <li>• Through financial incentives for attaining key performance indicators</li> <li>• Via contractual obligations and mandatory subcontracting requirements</li> </ul>
<i>Dispute resolution mechanisms (DRM)</i>	<ul style="list-style-type: none"> <li>• Conventional DRMs (i.e. litigation, arbitration, adjudication)</li> <li>• Alternative DRMs (e.g. Mediation, conciliation, early neutral evaluation, Partnering)</li> </ul>
<i>Bondings / Safeguarding approaches</i>	<ul style="list-style-type: none"> <li>• Performance/Surety bonds</li> <li>• Bank Guarantees</li> <li>• Standby letters of credit</li> <li>• Cash retentions</li> <li>• Parent company guarantee</li> <li>• No need for use of bonds as a means of safeguarding - Instead the focus is on pre-qualifications, direct negotiation, single project insurance and collaborative/relation-based delivery approaches</li> </ul>

There is no doubt that the deployment of efficient procurement arrangements (i.e. procurement systems, sub-systems and options) may increase the likelihoods of 'project success' and overall client satisfaction in a particular project context (Kumaraswamy and Dissanayak, 1998). However, in order to optimise the whole, it is important to consider the influence of the interactions between the sub-systems on the output of the main procurement system (Kumaraswamy and Dissanayak, 1998). It is also critical to ensure the compatibility

of the chosen procurement options from within each sub-system with the selected project delivery system, client and project needs, and other contextual conditions that bear on the project (Kumaraswamy and Dissanayak, 1998). For instance, it may be unsuitable to choose a cost-reimbursement pricing option for a traditionally procured project (Love *et al.*, 1998). Similarly, it would be inefficient to adapt a bid evaluation strategy based on lowest tender price for the selection of project team members of a partnering project (Eriksson *et al.*, 2008). Thus, it is suggested that procurement arrangements should be crafted to support production system requirements and improve flow processes, rather than being based on cost and risk-averse considerations that may lead to sub-optimisation (Sarhan *et al.*, 2017). The premise here is based on 'optimising the whole' rather than 'optimising the parts'.

Based on these arguments, it is thus ironic how that an empirical survey (Zaghloul and Hartman, 2003), that was conducted in the Canadian and the United States construction industries, revealed that inappropriate risk allocation through disclaimer (exculpatory) clauses in contracts is still the general traditional practice in the construction industry; and that their use is prevalent to an extent that they continue to be utilized in some of the newer contractual agreements such as partnering/alliances. Similarly, it is interesting that the clients of many projects that have been procured using an integrated project delivery (IPD) system still rely on the use of performance/surety bonds and traditional insurance arrangements, despite the latter in particular being identified by leading industry professionals in the US as one of the biggest worries for the adoption of IPD to its full capacity (Kent, and Becerik-Gerber, 2010; Ghassemi and Becerik-Gerber, 2011). That is because it was found that traditional insurance products impose liability issues on each project-party separately and thus make collaboration complicated. The same has been asserted by expert construction professionals in the UK who suggested that conventional arrangements for providing insurance cover add unnecessary costs to constructions projects, and can also obstruct collaboration between supply chains (Ndekugri *et al.*, 2013). According to Mossman *et al.* (2010, p. 11)

*"If each party to a relational agreement is required to have its own insurance and there is a claim during design or construction, an insurance company could force parties to sue one another in order to trigger insurance coverage, threatening relationships".*

These examples suggest the existence of serious power disparities within the construction market place; this in turn allows actors with power, and who may have vested interests for the wide-spread use of some imperfect procurement arrangements, to dictate the rules of the game - the way we do business. Winch (2000a), suggested a number of different factors, yet often working in combination, that could allow some actors in a business system to become relatively powerful compared to others. These were identified by him as those possessing the following capabilities:

- *Ability to solve complex problems for the client* - e.g. the traditional role of the architect and the consultant engineer in the British system which provides them with the privilege to solve complex problems for the client through the briefing process.
- *The blessing of the state (e.g. statutory protection)* - For instance, in many countries (e.g. France and Germany) only the architect can apply for building permissions.
- *Ability to manage risk for the client* - This includes control actors, such as the quantity surveyor, in the UK, whose role was developed to mediate the power of the general contractor on behalf of the client.

## **The Significance of Procurement as Institutional Arrangements**

Construction business systems are regarded as institutions (Winch, 2000a&b; Sha, 2004) that are created in countries to specify ‘the rules of the game’, and regulate the relations and interactions between the different parties involved in the industry. The evolution of these business systems are path dependent and also heavily reliant on the cultural and regulative context within each country (Sha, 2004; Matos-Castano *et al.*, 2014). In other words, the national context leads to the formation of specific business systems which in turn influence the orientation, strategies and performance of individual firms in nationally distinctive ways (Winch, 2000a). Similarly, this study argues that procurement systems, as institutional arrangements, are designed to assign liabilities and authorities to people and organizations (Love *et al.*, 1998) at the programme and project levels; and thus structure the borders that shape ‘*the play of the game*’ (Williamson, 2000). Inappropriate procurement arrangements may lead to time and cost overruns, adversarial relationships between project parties, and ultimately the failure of projects (Kumaraswamy and Dissanayaka, 1998; Mante *et al.*, 2012; Watermeyer, 2012). Thus, there is a wide agreement among scholars and many clients on the fact that getting the construction procurement context right is central to project success (Latham, 1994; Love *et al.*, 1998; Tookey *et al.*, 2001; Eriksson and Laan, 2007; Osipova and Eriksson, 2011).

The construction industry has, over a long period, been subject to substantial criticism for its opportunistic relationships, with conflicts and disputes, and lack of trust, collaboration and customer focus often cited as significant amongst its various shortcomings (Egan, 1998; Rooke *et al.*, 2003; Eriksson and Laan, 2007; Love *et al.*, 2010). Hence, traditional procurement arrangements (e.g. separated methods) are potential root causes for the opportunism and lack of cooperation that characterise many construction projects (Eriksson and Laan, 2007; Osipova and Eriksson, 2011), the industry has been urged to start using new and less familiar procurement systems (e.g. partnering and alliancing) that are believed to be capable of enhancing collaboration, commitment and trust between project parties (Egan, 1998). However, despite the strong advocacy for the use of partnering and of the potential benefits that it could attain, its implementation in the construction industry generally remains patchy rather than widespread (Phua, 2006; Eriksson *et al.*, 2008). The same applies to other innovative delivery approaches such as the integrated project delivery (IPD) system (Kent

and Becerik-Gerber, 2010). It is thus questionable why traditional procurement arrangements still remain very prevalent in the construction industry (RICS, 2004; CIOB, 2010; RIBA, 2013), and have not, yet, been replaced by more collaborative/relation-based procurement arrangements (e.g. partnering and framework agreements) that are deemed to be more efficient. Even when partnering is utilised, the relationship between contractors and subcontractors is often regarded as '*mere ceremony*' (Meyer and Rowan, 1977) and aimed at signalling legitimacy to key observers (Greenwood, 2001). Thus, this is a fundamental question since there are substantial trends towards cooperative ways of working as a means for improving project performance and outcomes. A number of theoretical perceptions exist in literature to predict and explain the reasons for the establishment, process and outcomes of several forms of institutional and organisational arrangements. Out of these, three principal theories seem to provide profound conceptual insights:

1. Transaction cost economics (TCE) (see Williamson, 1975, 1985);
2. Resource-dependence Theory (RDT) (see Pfeffer and Salancik, 1978); and
3. Neo-institutional theory of organisational studies (see Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Scott, 2005).

A common conceptual assumption amongst all is that social or economic actors make rational, albeit bounded, and purposive decisions about the types of contractual and organisational arrangements, that they would form or join, depending on what they conceive to be most beneficial (Phua, 2006). However, it is important to realise that not all institutional and organisational arrangements are cost-based (Rindfleisch and Heide, 1997). For instance, the theory of institutional isomorphism (DiMaggio and Powell, 1983), in contrast to TCE and RDT, has established that many organisational arrangements are not necessarily formed based on efficiency considerations only. Instead, some are also formed due to imitation, mere ceremony (Meyer and Rowan, 1977), or the fact that they are widely shared, disseminated, and taken for granted throughout an organisational field (e.g. the construction industry) (DiMaggio and Powell, 1983).

An empirical survey study of 87 professional construction clients in Sweden was conducted by Eriksson *et al.*, (2008) to identify the critical barriers to partnering; and to analyse the correlations between clients' perceptions of these barriers, and their actual behaviour in the form of procurement procedures. The study found that the clients' desired objective of increasing cooperation between project parties does not affect their procurement procedures. Clients perceive partnering and cooperative arrangements to be significant and beneficial, but still heavily rely on the use of procurement procedures that foster competition and adversarial relationships. The authors offered two possible explanations for these contradictory results. First, that clients may not be aware of how their procurement decisions and procedures may affect their likelihoods of creating a cooperative environment (Eriksson *et al.*, 2008), and thus impact on project performance and outcomes. Secondly, that clients may not be incentivised enough to adapt less familiar procurement arrangements that are potentially more efficient than conventional approaches (Eriksson *et al.*, 2008).

This lack of incentive for the use of partnering or other collaborative modalities (i.e. lean construction) has been attributed by scholars to several factors such as: lack of adequate awareness and understanding and top management commitment (Eriksson et al., 2008; Sarhan and Fox, 2013), and the fact that the construction industry operates in a very competitively cost-driven environment (Bresnen and Marshall, 2000). This issue could also be linked to the phenomena described by Bresnen and Haslam (1991) as "habituation", which occurs as experienced clients establish a 'close-minded' approach to building, thereby merely utilizing those procurement procedures that are most familiar to them (Love *et al.*, 1998). Additionally, it could be argued that many clients conform to imperfect conventional procurement procedures, due to institutional pressure imposed on them (DiMaggio and Powell, 1983; Sarhan *et al.*, 2017). Most construction clients are inexperienced or one-off procurers of construction projects (Love *et al.*, 2010); and as such, they invariably rely on professional advice from consultants, financiers and legal advisers. These professional advisers may have a vested interest (i.e. social and/or economic motivations) for the widespread use of specific procurement arrangements that may be inefficient in comparison to other newer alternatives (Pasquire *et al.*, 2015).

Apart from purely economic-based determinants, very few studies in the construction management literature have been conducted to investigate the role played by institutional determinants in predicting the establishment of project-organisational arrangements, of which partnering as a collaborative procurement system is one. To fill this gap, Phua (2006) carried out a survey study completed by 526 firms covering various industry disciplines in Hong Kong, in order to shed some empirical light on the reason for the apparent limited use of partnering arrangements in the construction industry. More specifically, the study focussed on investigating whether using an institutional framework could help to provide some useful explanations as to when partnering is likely to occur. Compellingly, the findings have shown that institutional forces far outweigh the significance of economic forces in determining whether or not firms will adopt partnering. It was found that none of the financial incentives in terms of increased profitability, competitiveness or likelihood of increased resource acquisition and reallocation had any significant impact on firms' decisions to adopt partnering at all. Instead, the results showed that the majority of construction firms have not adopted partnering as an alternative to traditional procurement methods, due to the lack of strong institutional partnering norms in the industry. According to Phua (2006, p.622):

*"Because the benefits or more precisely the economic and management advantages that firms could gain from using partnering are still debatable and difficult to measure, there is no a priori reason to expect firms to favour its use over other procurement methods other than the fact that there are obvious institutional norms that propel firms to use it".*

The premise of institutional theory is that individual (i.e. persons) and collective (i.e. organisations) social actors are expected to comply with institutional forces imposed on them, because those that conform 'are rewarded through increased legitimacy, resources, and survival capabilities' (Scott, 1987, p. 498). When the same institutional forces continue to



exist over time, firms within relatively circumscribed fields that are bounded by shared understandings and mutual dependence (Scott, 2012) become more homogenous (DiMaggio and Powell, 1983); and thus a dominant organisational arrangement, or 'proto-institution' (Lawrence *et al.*, 2002), is likely to occur (Phua, 2006). Thus, as a corollary, it is argued that the extent to which actors are inclined to the use of imperfect procurement arrangements (e.g. traditional procurement systems), that are deemed to be inefficient in comparison to other more innovative and collaborative approaches, is a function of how deeply entrenched the institutional environment is with respect to rules, technologies, norms, beliefs and expectations that are associated with the concerned practices. Having considered the factors that influence the emergence of organisational arrangements; as well as the impact of procurement systems, as institutional arrangements, on project-team performance and outcomes, the focus now shifts to an introduction of institutional theory and subsequently an exploration of neo-institutional theory.

## **BACKGROUND OF THE INSTITUTIONAL THEORY**

Institutional theory has a long and complex history dating back to the mid-nineteenth century and incorporates the pioneering insights of seminal scholars of the social sciences such as Max Webber (Scott, 2005). Old institutional arguments relied on notions that 'institutional contexts structure action'. According to Meyer (2008) *'Individuals were seen as creatures of habit groups as controlled by customs and societies as organized around culture'* (p. 790). Theories stretched from the economic to political and religious fields, emphasising more organisational or cultural forms of control. However, in general, the nature of institutions and their forms of control over action were always subject to a lack of clarity and consensus in social scientific thinking (Meyer, 2008).

The old institutionalism was encountered by constant debates about free will and determinism; as it saw humans, groups and organisations as naturally embedded entities in broad cultural and structural contexts. In brief, the old institutionalism was marginalised by the rise of the social sciences of modernity, where conceptions were built around notions of society being comprised of empowered, fairly rational, and rather free actors (Meyer, 2008). These actors include individuals, governments, and the organisations created by people and governments. In addition, much of the work focused on institutionalism from these periods was subsumed in the storming advances of neoclassical theory in economics, behaviouralism in political science, and positivism in sociology. Further development by John Meyer and his colleagues at Stanford University led to a significant revival for the ideas of institutionalism from 1977, with the formulation of neo-institutional theory (Scott, 2005; 2008).

## **NEO-INSTITUTIONAL THEORY**

The neo-institutional theory developed in response to specific processes and structures (i.e. causes of structural change in organisations) that were not adequately explained by prevailing rational-actor and contingency theories (DiMaggio and Powell, 1983; Mahalingam and

Levitt, 2007). For example, bureaucratic organisations continued to follow rules that in some cases conflicted with the organisations' own goals. The general argument advanced by the foundational work of Meyer and Rowan (1977) was that formal organisational structures reflected institutional forces instead of technological requirements and resource dependencies. They argued that many of the models giving rise to organisations are based on rationalised myths and rule-like frameworks that depend for their efficacy on imitation and the fact that they are widely shared and disseminated.

In brief, conventional neo-institutionalism literature, in replication of the old institutionalism, emphasised the ways by which institutions constrained and directed people (now perceived as bounded, purposive and empowered actors) to behave in certain regular, relatively rational, but homogeneous and expected ways (DiMaggio and Powell, 1983). With more than 30 years of progress since neo-institutional theory penetrated organisational sociology, the theory has been subject to various developments including reformulation of some of its arguments. Next, three significant areas of development, which are most relevant to the study, will be briefly highlighted (for a fuller review, see Scott, 2008).

## **Institutional Isomorphism**

In the 1970s, when research efforts were focussed on understanding the reasons for variations amongst the *kind* (i.e. structural features) of organisations, seminal work by DiMaggio and Powell (1983) sought to explain *homogeneity* of organisations and practices rather than their variations. Their contention was that: "*Highly structured organisation fields provide a context in which individual efforts to deal rationally with uncertainty and constraint often lead, in the aggregate, to homogeneity in structure, culture, and output*" (p. 144). They described this phenomenon as institutional isomorphic change, which occurs through three mechanisms:

- (1) 'Coercive isomorphism' that results from political forces and legitimacy issues;
- (2) 'Mimetic isomorphism' occurring due to standard responses to uncertainty; and
- (3) 'Normative isomorphism' associated with professionalisation.

Organisational fields can be defined as those independent actors (i.e. persons and organisations), within somewhat circumscribed arenas, that produce similar services or products and constitute a shared culture and social sub-system (Scott, 2008, 2012). The logic for applying work at organisational field levels is that it provides us with a more systematic level of analysis; as attention is shifted from focussing merely on '*organisations in environments*' to focussing on the '*organisation of the environment*', with particular consideration to organisations as the key players of the field (Scott, 2008).

## Institutional Pillars and Carriers

Institutional theory has been widely employed among social, economic and political sciences to examine systems ranging from micro-interpersonal interactions to macro global frameworks. Despite the fact that the theory had multiple roots; there is a wide consensus that institutions matter (Peng *et al.*, 2009). Nevertheless, social scholars in various ways were adopting the theory, and there seemed to be a crucial need to move from a looser to a tighter conceptualisation. For this reason, iconic sociologist W. Richard Scott provided a comprehensive conceptual schema (see Table 2), based on his extensive survey to institutional literature, that guides directions for pursuing such a theory. Scott defined institutions as: ‘*regulative, normative, and cultural/cognitive systems and structures that, together with associated activities and resources, provide stability and meaning to social life*’ (Scott, 2001, p. 48). His aim was not to provide a new integrated theory of institutions, but instead to better enable us to capture both the commonality and the diversity of past and present conceptions of institutional theory (Scott, 2008).

**Table 2:** Scott’s Typology of Institutional Pillars and Carriers (Scott, 2001)

<u>Carriers</u>	<u>Pillars</u>		
	<i>Regulative</i>	<i>Normative</i>	<i>Cultural-Cognitive</i>
Symbolic Systems	Rules, laws	Values, expectations	Categories, typifications, schema
Relational Systems	Governance & power systems	Regimes, authority systems	Structural isomorphism identities
Routines	Protocols, Standard Operating Procedures	Jobs, roles, obedience to duty	Scripts
Artifacts	Objects complying with mandated specifications	Objects meeting conventions, standards	Objects possessing symbolic value

Hence legitimacy is a primary requisite of any stable social order, the three pillars are analytically distinguished to stress that although interrelated, but they work through varying mechanisms and distinctive motives for compliance (Scott, 2012). For instance, a 'regulative' perspective evaluates legitimacy according to the extent that systems operate in conformance to relevant legal or quasi-legal requirements. Alternatively, a 'normative' view asserts a moral basis for evaluating legitimacy; while a cultural-cognitive conception refers to the orthodox and taken for granted features of social life that widely shared beliefs within a community make possible (Scott, 2012).

## Strategic Responses to Institutional Pressure

Institutional theory pays significant attention to the context. It considers the processes by which structures including rules, norms, and routines become established as authoritative guidelines for social behaviour. Much of the early studies of institutional theory emphasised

that organisations and actors, operating within a specific context, were pressurised to conform to the requirements and constraints of their institutional environment (e.g. DiMaggio and Powell, 1983). Organisations' self-interested rewards obtained from conformance to these institutional forces include, for example, legitimacy, enhancing likelihood of survival, social support, stability, access to resources, acceptance in professions, and expedience to avoid questioning (Oliver, 1991). For these reasons, the prevalent language used was one of 'institutional effects', thereby inferring a determinant 'top-down' argument (Scott, 2005).

This unilateral perspective based on obedient organisations defocused attentions of institutional scholars away from the fact that social structures are continuously modified by the individual and collective actions of social actors. Thus, according to Scott (2008), one of the important advances to the progress of institutional theory is the introduction of agented actors and accordingly the rise of interactive arguments, which suggest that 'institutional processes' can operate in both 'top-down' and 'bottom up' directions. This was important because it allows us to also identify the social actors who held the widely shared beliefs, or were enforcing taken for granted norms (Scott, 2005).

It was the seminal work of Oliver (1991) who affirmed the role of organisational self-interest and active agency within institutional contexts; by cleverly integrating resource-dependence predictions of organisational strategy with the more limited responses to institutional pressures that traditional institutional models provoked. She pointed out that although acquiescence to institutional processes is the most likely response by organisations and their leaders; strategic responses could range from passive to active resistance as follows: acquiescence; compromise; avoid; defy; and manipulate. Accordingly, organisational reactions to institutional pressure towards conformity will depend on five institutional antecedents (Table 3).

**Table 3:** Institutional antecedents of strategic responses (extracted from Oliver, 1991)

<b>Institutional Factor</b>	<b>Research Question</b>	<b>Predictive Dimensions</b>
Cause	Why is the organisation being pressurised to conform to institutional rules or expectations?	<ul style="list-style-type: none"> <li>• Legitimacy or social fitness;</li> <li>• Efficiency or economic fitness</li> </ul>
Constituents	Who is asserting the institutional pressure on the organisation?	<ul style="list-style-type: none"> <li>• Multiplicity of constituent demands;</li> <li>• Dependency on institutional constituents</li> </ul>
Content	To what norms or requirements is the organisation being pressurised to conform?	<ul style="list-style-type: none"> <li>• Consistency with organisational goals;</li> <li>• Discretionary constituents imposed on the organisation;</li> </ul>
Control	How or by what means are the	<ul style="list-style-type: none"> <li>• Legal coercion or enforcement;</li> </ul>

	institutional pressures being exerted?	<ul style="list-style-type: none"> <li>• Voluntary diffusion of norms;</li> </ul>
Context	What is the environmental context within which institutional pressures are being exerted?	<ul style="list-style-type: none"> <li>• Environmental uncertainty;</li> <li>• Environmental interconnectedness</li> </ul>

## INSTITUTIONAL WASTE WITHIN CONSTRUCTION

Based on this study's hypothesis—that there are systems, structural arrangements and cognitive undergirding assumptions that support and encourage wasteful activities in construction—and building on the seminal studies of DiMaggio and Powell's (1983) institutional isomorphism, Scott's (2001) three pillars of institutionalism, and Oliver's (1991) topology of strategic responses; *institutional waste* is defined as:

‘the regulative, normative, and cognitive-culture institutional processes which support and/or encourage wasteful activities, that the construction industry (organisation field) accedes to in the form of habitual, imitation or compliance; in order to achieve legitimacy, security and survival at the price of production efficiency and effectiveness’.

*Effectiveness* refers to the extent to which a right target is achieved with resources applied (i.e. value and client satisfaction). *Efficiency* is the evaluation of how economically the resources are utilised to meet client requirements, based on production flow perspectives (Koskela, 2000). By *habitual*, here, the study means: adhering to invisible, widely shared and taken for granted norms that have been historically repeated; by *imitation*: consciously or unconsciously mimicking what other more successful organisations do and strictly following imperfect advice from consulting firms and professional institutions; and by *compliance*: obeying imperfect institutional requirements. This could include imposing more control in contracts and structural arrangements, for example, as a response to problems of a lack of trust. To elaborate and demonstrate our definition within the context of construction, the following propositions have been formulated (Figure 3).

**Figure 3:** Conceptual model of construction procurement as institutional arrangements

**Proposition 1:** *The higher the degree of social legitimacy, stability, and/or survival capability conceived by social actors, to be attainable from acquiescence to imperfect institutional pressure, the greater the likelihood of waste to be institutionalised within construction.*

An example of this could be the adherence of the construction industry to use short time-frame and price-competitive tendering processes, as a widely shared and taken for granted practice, despite it being associated with many flawed risk assumptions and criticised cost estimations (Laryea, 2011). Adding to this, is the use of extensive, time consuming and unnecessarily expensive prequalification procedures (Hughes *et al.*, 2001) in public projects,

e.g. questionnaires (PQQ), that may lead to wasteful activities such as cover-pricing. In particular, the use of PQQs for procuring projects below the European Union threshold (approximately £100,000) restrains many SMEs from applying for public contracts (i.e. waste of human potential) and substantially increases tendering costs and time (HM Government, 2013). This also includes the textual complexity and unnecessary formality in contract wordings of some contract conditions (i.e. FIDIC, 1999 and NEC, 1993) that are very difficult to read, and require at least college-level reading skills to correctly interpret them (Rameezdeen and Rajapakse, 2007; Rameezdeen and Rodrigo, 2013). It is important to emphasise here that lawyers and specialist surveyors are not the primary users of a contract; it is the project parties' ability to capture their meaning which is fundamental for contract performance (Rameezdeen and Rodrigo, 2013).

***Proposition 2:*** *The higher the degree of financial benefit, protection and guarantee, and/or vested interest rationalised by social actors, to be attainable from conformance to imperfect institutional processes, the greater the likelihood of waste to be institutionalised within construction.*

Examples of this include the heavily reliance of construction parties on the deep-rooted practice of using standard forms of contracts (Eriksson and Laan, 2007). These safeguards bring with it lots of formality and rigidity that stifles cooperation and focuses on the individual parties and their responsibilities; thereby driving a distance between project parties and encouraging opportunistic behaviour (Cox and Thompson, 1997; Eriksson et al. 2008). Other examples include the traditional use of disclaimer (exculpatory) clauses in construction contracts (Zaghloul and Hartman, 2003). This unfair risk allocation approach leads to increased costs of projects in the form of unnecessary contingencies and insurances (i.e. cost wastage), restricted bid-competitions (i.e. waste of human potential), and potential disputes (i.e. time waste). Similar imperfect procurement arrangements include the use of high rates of cash retentions on short contracts (Hughes *et al.*, 2000); and requirements for performance bonds that are often disproportionate and may restrict SMEs aiming to bid for public contracts (HM Government, 2013). More obvious examples include architects' and quantity surveyors' biased preferences for the use of traditional lump-sum procurement systems with provisional quantities (Love *et al.*, 1998).

***Proposition 3:*** *The higher the degree of dependency of social actors on imperfect institutional processes, the greater the likelihood of waste to be institutionalised within construction.*

An example of this could be organisations which depend on obtaining their funding through bank loans, and as a result may pay more attention to their funders' requirements rather than their customers' needs (Chiang and Cheng, 2010). Another example is clients' over-reliance on conventional insurance arrangements which add unnecessary costs to constructions projects and can also obstruct collaboration between supply chains (Ndekugri *et al.*, 2013). This could also be associated with the way that clients' advisors often set the 'rules of the game' (i.e. procurement type and construction periods stated in tenders) and then everyone



else has to work within these rules, which could sometimes be dysfunctional. This dilemma is often a result of discrepancies in power that exist among major players in the industry and within project coalitions (Winch, 2000a).

***Proposition 4:*** *The higher the degree of consistency of organisational goals and purposes with imperfect institutional pressures and norms, the greater the likelihood of waste to be institutionalised within construction.*

For instance, it's not unusual for construction organisations, because of competitive pressure, to rely on making their profits solely through commercial processes and manipulating roles with others, rather than struggling to improve production efficiency (Zimina and Pasquire, 2011b). As an interviewee in a study by Chiang and Cheng (2010) commented, contractors could only make profits, in this highly price-competitive industry, if they concentrated their efforts on three issues: (1) procurement of building materials; (2) cash flow management with their downstream supply chain; (3) planning for and application of claims. Thus, this suggests that it is important, for further studies, to identify clients' and construction organisations' characteristics, strategies and tactics, that make them more or less obedient to imperfect institutional processes..

***Proposition 5:*** *The higher the degree of voluntary diffusion of imperfect institutional rules, routines or norms, the greater the likelihood of waste to be institutionalised within construction.*

This is mainly associated with mimetic institutional waste. An example could be the imperfect norms, job duties and responsibilities diffused by professional institutions and trade associations, with which its members are requested to conform. In such cases of very widely taken-for-granted understandings of what constitute genuine practices, it is highly likely that practitioners will conform because it does not occur to them to do otherwise (Oliver, 1991). Labour/trade unions are also powerful actors that influence the culture in the construction industry. They were identified in an empirical study by Eriksson *et al.* (2008) as industry barriers to change in general, and increased cooperation in specific, due to their conservative and defensive culture that encourages upholding of the status quo. An example of imperfect institutional pressure diffused by trade unions, as identified by Eriksson *et al.* (2008), was their requirement for fixed piece rates, regardless of time, for blue-collar workers, which in turn undermined collaboration between different crafts. Another example would include decision maker's simply trying what others have found to work, for example traditional procurement, or critical path planning – push system technique (Koskela *et al.*, 2014).

***Proposition 6:*** *The higher the degree of environmental uncertainty, the greater the likelihood of waste to be institutionalised within construction.*

Environmental uncertainty in the construction industry can include, for e.g., fluctuations in the state of the economy comprised of factors such as inflation, changes to government macroeconomic policies and periods of instability of funding. Under such conditions, it is

more likely for organisations to adhere to imperfect institutional regulations, norms & requirements imposed on them by governmental management, funders, professional association and public media pressure for the sake of survival, legitimacy, and protection from environmental turbulence (Oliver, 1991).

## CONCLUDING DISCUSSION

The construction industry is often regarded as confrontational, risks averse, and lacking trust and capacity for innovation and improvement (Zaghloul and Hartman, 2003; Rooke *et al.*, 2004; Eriksson and Laan, 2007; Eriksson *et al.*, 2008). It has been extensively criticised, in particular, for its short term “hit-and-run” relationships which are focused on win-lose situations. Generally, increased collaboration between project parties, to support production flow, has been argued to be a suitable remedy for many of the industry’s problems (Eriksson *et al.*, 2008; Sarhan *et al.*, 2015). Since, the extent of cooperation (and trust) is largely influenced by procurement arrangements and procedures (Sarhan *et al.*, 2015, Eriksson and Laan, 2007); this is considered a key area that requires substantial attention and improvement (Egan, 1998) and which is central to overall client satisfaction and project success (Love *et al.*, 1998; Tookey *et al.*, 2001; Osipova and Eriksson, 2011). A small but emerging number of studies have attempted to investigate the relationship between procurement systems and waste in construction (e.g. Gamage *et al.*, 2009). However, most of these studies, if not all, have limited their attention to material waste as opposed to process waste and value creation. Additionally, very few, if any waste-related studies, have sought to explore the influence of performance shaping mechanisms (i.e. institutional context in which human actions take place and decisions are made) within the construction procurement context.

Hence, Construction business systems are regarded as institutions (Winch, 2000a&b; Sha, 2004) that are created in countries to specify ‘the rules of the game’, and regulate the relations and interactions between the different parties involved in the industry. As a corollary, this study conceptualises procurement systems *as institutional arrangements* that are designed to assign liabilities and authorities to people and organizations at the programme and project levels; and thus structure the borders that shape *the play of the game*. According to economic institutionalists, there are at least three types of influences that institutions, whether formal (e.g. rules and regulations) or informal (e.g. norms), have on behaviour (Dequesh, 2002, Phua, 2006):

- Constraints on behaviour in the form of rules and regulations and set of procedures to detect deviations from the rules and regulations, and set of moral and ethical norms that define the borders that confine the way in which the rules and regulations are specified and enforcement is carried out (i.e. restrictive function);
- Influence on perception or reception of reality (ie. informational-cognitive function);
- Influence on end goals that people pursue (i.e motivational or teleological function).

From an economic perspective, it is easy to understand why economic actors are more likely to conform to institutional forces, as this will be based on obvious cost and efficiency-based considerations; and also due to the prevailing '*norms that provide "legitimacy" to a set of rules*' (North, 1994, p. 366). However, the social perspective argues that the compliance with institutional processes is not necessarily based on efficiency considerations. Instead, conformance is principally based on social legitimacy drivers (Scott, 2012). The compliance with norms, beliefs and regulations is regarded important, because it allows those who comply with them to gain increased legitimacy, survival capability, social support, stability, access to resources, acceptance in professions, and expedience to avoid questioning (Oliver, 1991, Scott, 2005).

Despite the distinctive differences underpinning each of these two perspectives, an overarching assumption common to both is that people and organisations are seen as rational, purposive and empowered, albeit bounded, actors whose behaviours and decisions are constrained by the influence of the institutional pressure imposed on them (Phua, 2006). Scott (2012) has argued that the concepts employed in contingency and resource-based studies are relatively limited when compared to neo-institutional theory of social and organisational studies, as they direct main attention to governments and regulatory systems; thereby neglecting the equally important roles played by normative and cultural-cognitive systems. Similarly, the authors of this study believe that institutional concepts used in economic-based studies (e.g. Williamson, 2000), overlook, or at least give less attention to, normative and cultural-cognitive systems, that are vital forces affecting the success of construction projects (Scott, 2012). Hence, the construction industry is very labour-intensive/oriented, it seems to us therefore that neo-institutional theory is more suitable and powerful for construction management studies in general, and this study in specific.

The fact that much of the waste produced in construction is common to many projects led to the study's hypothesis that there are imperfect institutional regulations, norms, and cultural - cognitive framework assumptions within the construction procurement context, which support and/or encourage wasteful activities. Examples of these include: traditional lump-sum procurement systems based on price-competitive tendering (Winch, 2000b; Love *et al.*, 2011b; Laryea and Hughes, 2008; Mohammed *et al.*, 2011); silo thinking and resistance to change such that existing values and beliefs are not open for questioning (Winch, 2000a; Eriksson *et al.*, 2008); traditional insurance products (Kent and Becerik Gerber, 2010; Ndekugri *et al.*, 2013); textual complexity of standard contracts (Rameezdeen and Rajapakse, 2007; Rameezdeen and Rodrigo, 2013), disclaimer clauses (Zaghloul & Hartman, 2003; Love *et al.*, 2010); late payments (Poverbs, 2000; Hughes, 2000),; the short-term focus as exemplified by clients' habit of changing suppliers between projects through the frequent use of open bid invitation procedures (Eriksson *et al.*, 2008).

Many of these imperfect procurement arrangements and assumptions are common in construction projects, leading to frequent unsatisfactory outcomes. It is thus questionable why conventional procurement systems remain very prevalent, as opposed to newer and more collaborative forms of procurement that are deemed to be more beneficial and efficient. This

is a valid fundamental question hence there are substantial trends towards establishing cooperative ways of working as a means for improving project performance and outcomes. Previous research has provided different explanations which helped to partially explain the reason for this contradiction between clients' desires and actions. These included the fact that the construction industry operates in a very competitively cost-driven environment (Bresnen and Marshall, 2000). In a study by Eriksson *et al.* (2008), it was suggested that clients lack the incentives for the use of partnering due to inadequate awareness and understanding of how their procurement procedures influence their likelihoods of creating a cooperative environment. Other reasons suggested by them included lack of top management commitment and resistance to change. Similarly, Brensen and Haslam (1991) linked this to the "habituation" phenomenon that occurs as experienced clients establish a 'close-minded' approach to building, thereby merely utilizing those procurement procedures that are most familiar to them (Love *et al.*, 1998). Phua (2006) attributed this to the lack of dominating industry norms that advocate the use of partnering (e.g. government policies and guidelines, technologies, beliefs and expectations).

Additionally, it could be argued that many clients conform to imperfect conventional procurement procedures, due to institutional pressure imposed on them (Sarhan *et al.*, 2015). Most of the clients, who procure construction projects, lack experience and may only ever build once or twice (Love *et al.*, 2010). Thus, they invariably rely on taking professional advice from consultants, financiers, and legal advisers. These actors who are relatively powered than other (Winch, 2000a), may have a vested interest (i.e. social and/or economic motivations) for the wide-spread use of some imperfect procurement arrangements; thereby dictating the rules of the game - the way we do business (Sarhan *et al.*, 2015). When imperfect procurement (institutional) arrangements prevail they restrict and govern the way that project partners behave and interact, leading to common and repeated unsatisfactory outcomes (see Figure 3).

Due to the one-off nature of many construction projects and the short-term focus characterising many construction clients and decision-makers, there are less opportunities for learning from project outcomes. Let alone, that the construction industry, as an organisational field (DiMaggio and Powell, 1983), is particularly characterized by its high levels of complexity and industry specific uncertainties and interdependences (Dubois and Gadde, 2002). Accordingly, this study argues that imperfect institutional forces that surround the construction procurement environment lead to more legitimacy and/or use of risk-averse safeguarding approaches in procurement (Sarhan *et al.*, 2017), which deter attention away from core-efficiency purposes; thereby restricting value creation and possibly decreasing revenues for all project parties. When the same or similar (imperfect) institutional pressures continue over time, isomorphism (DiMaggio and Powell, 1983) will lead to (inefficient) construction procurement arrangements becoming more homogeneous, and as a result, standardised patterns of behaviour and common project outcomes are most likely to occur. These arguments are supported by Winch (2000a) who stressed, albeit through a relatively limited economic insight that:

*"Just as patterns of behaviour become institutionalized so that they act back upon the actors through the process of structuration (Giddens, 1984), the rules of the game come to be seen as given, normal, the only way to do things. Careers and status become dependent upon certain rules; threats to those rules become personal attacks". (p. 90)*

Work by Sarhan *et al.* (2016) discussed the factors influencing the ‘Principal-Agent’ relationship in construction, demonstrating that institutional forces (i.e. vested interests and bargaining strength of major industry players) can have an influence on shaping procurement practices. Their study used the UK’s Highways Agency transformation into Highways England, as a practical example of how construction models and procurement practices often mirror institutional factors. According to them, this transformation and change in the status of the principal has led to change in rules and procurement practices in the UK highways sector. This included, for example, a movement from the deployment of large integrated ‘manage and maintain’ contracts towards fragmenting contracts in order to secure greater control and visibility of costs.

A subsequent study by Sarhan *et al.* (2017) identified and critically evaluated a number of imperfect taken for granted safeguarding techniques (Table 4) in construction procurement, which stifle cooperation and entrench wasteful processes across the supply chain and throughout the project. According to them, these imperfect procurement arrangements dominate the management of the project delivery often to the detriment of the project itself; but because there is a belief that interests are safeguarded, clients and decision makers feel they have taken the best course of action. Thus, these imperfect safeguarding practices, based on mal-applied transactional considerations, was described by them as a source of institutionalised waste in construction. They argued that ‘self-interest’ (as a cultural/cognitive institutional factor) drives opportunism and influences governance approaches, leading to a dichotomy as one organisation seeks to protect its interests from the opportunism of others whilst continuing to exploit all opportunities. Interestingly, their study urged us to focus our attention towards institutional factors influencing the choice of imperfect procurement arrangements, as they are the ‘root causes’ for many of the wastes we encounter at the supply-chain level.

Table 4: A categorisation of various safeguarding approaches in construction procurement (Sarhan *et al.*, 2017)

<b>Prevalent safeguarding approaches based on 'risk allocation' considerations</b>	<b>Less prevalent safeguarding approaches based on 'process flow' considerations</b>
Standard forms of contract	Relational contracting
Use of Disclaimer/Exculpatory clauses	Shared risks and rewards
Traditional insurance arrangements/products	Single project insurance
Collateral warranties	Latent defects insurance

This study builds on the work of Sarhan *et al.* (2016 and 2017) to provide explanations as to how that an imperfect institutional environment can lead to inferior construction procurement arrangements, which may cause transaction and production losses (i.e. waste). In general, increased trustful collaboration between project parties, to support and enhance production flow, is argued to be an appropriate remedy for many of the industry's problems (see e.g. Eriksson *et al.*, 2008; Xue *et al.*, 2010; Sebastian, 2011; Walker *et al.*, 2017). The adoption of collaborative procurement approaches can help to align interests and eliminate much of the waste embedded in construction processes; however, arguably, the prevailing imperfect institutional factors and mind-sets are pinning the wasteful system in place. The conceptual model (Figure) and guiding propositions provided in this study could act as a primary step for unpicking the coherence and yet wastefulness of the current construction business models. This approach resonates with Matos-Castano's (2014) assertion that providing an enabling environment for newer and more collaborative construction business and procurement models entails a combination of changing existing institutions relating to project procurement and creating supporting institutions that build trustful collaboration between and among stakeholders, as opposed to merely creating institutions to provide legitimacy to public sector decision makers.

## CONCLUSIONS AND FURTHER RESEARCH

The prevailing understanding of waste, arguably, encourages the improvement of current processes rather than fundamental system redesign. Obtaining a better understanding and conceptualisation of waste in construction is therefore becoming more crucial to prepare the industry for the radical change demanded. Certainly, one aspect of this change is consideration of the wider institutional, organisational, and commercial environments that surround the design and delivery of construction projects. Institutions influence beliefs, norms and actions; thus they shape performance and outcomes. However, this study found that the concept of institutions is not well established in construction management and economics research, specifically in waste-related literature. An overall analysis of the concept of waste in construction, revealed that very few, if any, studies have sought to consider the influence of the commercial and institutional context on pinning the prevailing wasteful system in place.

This study has offered a novel perspective to the generation and persistence of waste in construction projects by introducing the concept of 'Institutional Waste' within the construction procurement context. The study has also exemplified various taken-for-granted rules, norms and meanings that impede efficiency and improvement efforts in construction. Based on a thorough review of construction-procurement literature, using neo-institutional theory as an analytical lens, the study stressed that construction procurement arrangements and practices are shaped by institutional structures, beliefs and attitudes as well as project characteristics. The study also demonstrated how that an imperfect institutional environment influences construction procurement arrangements, thereby contributing to the generation of institutionalised wastes in construction projects. Having provided a conceptual framework,



the six propositions developed, within this study, lend themselves to empirical testing. The underlying premise of this study is that if we can understand the detailed ‘institutional causes’ of coherence for the prevailing construction business models and reveal the consequential waste, then the adoption of more efficient and collaborative business and project delivery models may become more widespread.

The scope of this study is limited to commercial buildings, industrial construction and infrastructure projects in the UK. However, with an exception to the varying regulative context within different countries, it could be argued that the construction culture and norms of practice are relatively universal (Rooke *et al.*, 2003). Thus, the concept of ‘institutional waste’ has the potential to be generalised across the whole construction industry worldwide. Future studies are encouraged to assess the concept’s compatibility, relevance and significance to other sectors and industries.

The findings presented in this study provide a theoretical anchor and rationale for future re-shaping of the roles and responsibilities of the professions and wider participants involved within the construction sector, in order to increase the production effectiveness of the industry. Future studies are also recommended to gain a better understanding of the clients' and major players' characteristics, strategies and tactics, that make them more or less obedient to imperfect institutional and commercial pressure. In that way, this can help clients and decision makers to be aware of the institutional factors affecting the choice of their procurement procedures, and thus their desired project outcomes. Also, it could enable them to consider the adoption of newer contractual and project-organisational techniques that could be of more value to them.

## ACKNOWLEDGEMENTS

Special thanks to the anonymous reviewers whose comprehensive feedback and comments have helped to improve the focus and quality of this paper.

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## Appendix 1: A snapshot of Table of information developed for literature review purposes

Study	Research Method	Main aim(s) of the study	Imperfections within the construction procurement context
<b>Tookey et al. (2001)</b>	A questionnaire based on Masterman's (1994) procurement contentions for assessment of procurement choice. The study targeted a sample of 12 projects giving permission for the research team to gather data. An approach of elite interviewing was used targeting critical decision makers on the projects	To identify whether clients follow prescriptive procurement guidelines provided by academics for selection of appropriate procurement system	<ul style="list-style-type: none"> <li>• Clients' over-reliance on professional advice given to them by consultants, which may be biased, misleading or based on vested interest;</li> <li>• The existing approach to procurement selection which is based on tender cost and (imperfect) contract type dictating organisational structure. For example, 'Too many clients [use] Joint Contracts Tribunal (JCT) contracts even if [inappropriate]' (Contracts Journal, 2000) – This selection of use is often based on imitation rather than efficiency reasons. As a consequence of this choice, the (imperfect) contract type dictates the project-organisational structure which governs the way functions interact during product development.</li> </ul>
<b>Wordley (1991)</b>	Literature review/opinion based	To examine the respective concepts of both collateral warranties and Latent defects insurance with a view to highlighting the strengths and weaknesses of each arrangement.	<ul style="list-style-type: none"> <li>• Collateral warranties – vagaries of litigation together with its transactional cost, delay and substantial demands on management time; uncertainty about the performance of the asset backing the warranty; increases the overall cost of the insurance on any one project; hinders collaboration and encourages disputes</li> </ul>
<b>Eriksson et al. (2008)</b>	A survey study of 87 professional construction clients in Sweden.	To identify critical barriers to partnering, as perceived by construction clients, and the specific measures that are taken to overcome them during implementation.	<ul style="list-style-type: none"> <li>• Cultural barriers to partnering/cooperation as identified from literature: <ul style="list-style-type: none"> <li>○ Short term focus – is accentuated by the clients' habit of changing suppliers between projects through the frequent use of open bid invitation procedures</li> <li>○ Adversarial attitudes - Win-lose situations</li> <li>○ Conservative industry culture - existing values and beliefs are not open for questioning</li> <li>○ Lack of sub-supplier involvement in specification</li> </ul> </li> <li>• Organisational barriers to partnering/ cooperation: <ul style="list-style-type: none"> <li>○ Focus on project outcomes instead of processes</li> <li>○ Traditional organisation of the construction process (e.g. sequential processes)</li> <li>○ Traditional procurement procedures – e.g. The focus on lowest price in bid evaluation</li> <li>○ New competence requirements</li> </ul> </li> <li>• Industrial barriers to partnering/cooperation: <ul style="list-style-type: none"> <li>○ Trade/Labour Unions - have a conservative and defensive culture that inhibits change and encourages maintenance of the status quo (Craft, 1991). An example from the Swedish construction industry is their requirement for piecework rates (fixed piece rate for each unit produced or action performed regardless of time) for blue-collar workers that do not encourage collaboration between different crafts</li> <li>○ Deep-rooted practice of using standard contracts established by third parties - bring a formality that stifles good relationships, and focus on the individual parties and their responsibilities, thereby driving a distance between them</li> <li>○ Laws and regulations (no specific examples were provided within the study)</li> </ul> </li> </ul> <p>Note: by using Principal component factor analysis (PCFA), labour unions loaded more on the cultural barrier factor than on the expected industrial barrier factor.</p>

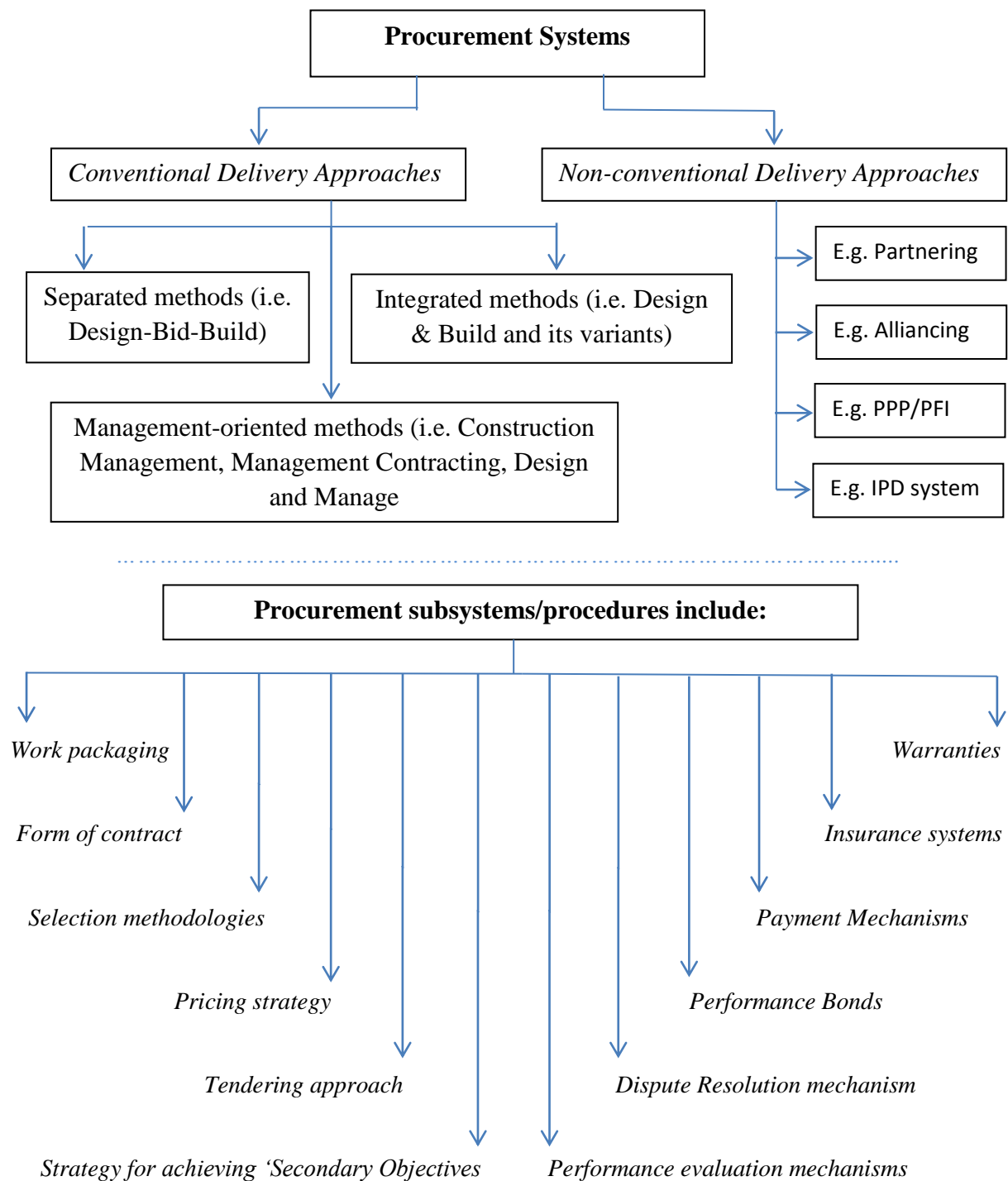


**Figure 1**



e.g. Accidents, Delay, waiting, Rework Over-ordered materials Damaged materials Multiple handling of materials Making-Do Poor payment systems Duplicate insurance cover Settling disputes after PC Tendering Procuring services on cost	<b>What the customer wants</b>	What we have to do to enable us to create what the customer wants e.g. Procurement Taxes Insurance Logistics Accounting Cost estimating Commercial management - for clarification see: Zimina & Pasquire (2011)
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**Figure 2**



**Figure 3**

